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10/537,350

06/06/2005

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EXAMINER

BHAT, NINA NMN

ART UNIT

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1797

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

| | | | |
|------------------------------|--------------------------------------|-------------------------------------------|--|
| Office Action Summary | Application No. 10/537,350 | Applicant(s) CAVAGLIA, GIULIANO | |
| | Examiner N. Bhat | Art Unit 1797 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 February 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 62-122 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 62-122 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 06 June 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|----------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>6-6-2005</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. The examiner acknowledges applicant's first and second Preliminary Amendments. Claims 1-61 have been cancelled in favor of new claims 62-122. The examiner acknowledges that this application has been filed as a 371 type application; both the apparatus and the process will be examined together and are not subject to restriction/election.
2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 62-67 are rejected under 35 U.S.C. 102(b) as being anticipated by Staffin et al., US Patent 5,169,913.

Staffin et al. teach a horizontal fluidized bed reactor which is capable of operating as a reactor for solid phase continuous polymerization of PET, the reactor includes a casing, a feeding line to feed pre-polymers into the reactor, a gas lines well as appropriate valving, a charge line which is connected to the bottom of the reactor to discharge the polymerized product, a circuit to purify the gas and to recover the gas and to recover pre-polymer and wherein the reactor includes a plurality of fluidized stages which would inherently increase the intrinsic viscosity of the PET. Specifically, Staffin et al. teach a Single shell reactor (10 which includes three compartmented separations (31A-31C), the polymer and/or catalyst are fed

through feed port (58), there are includes baffles as shown in Figure 6 to accomplish a serpentine course for the fluidized polymer to flow, the fluidized bed of polymer pass from one zone to the adjacent zone as shown in Figures 2a and 2b. The polymer bed which consists of particles increase in size as the polymerization process flows through the reactor zone around each baffle and through the slots 55A, 55B, 55C in each zone dividing wall (64A, 64B, 64C).

[Note Column 2, lines 31-47; Column 4, lines 8-67; Column 5, lines 11-45; Column 6, lines 51 - 62] Staffin et al. fully anticipates applicant's claims as presently drafted.

4. Claims 62, 67-69, 71, -74, 76, 78-88, 91, 93-112, 115 and 120-122 are rejected under 35 U.S.C. 102(e) as being anticipated by Chen et al., US Patent 7,098,300.

Chen et al. teach an apparatus and process for continuous solid phase polymerization which includes a fluidized multistage reactor. Chen et al. teach that five fluidized stages or more provide advantageous performance. Chen et al. teach that a multiple stage fluidized SSP reactor which includes a casing, a feeding to feed a low molecular weight PET or pre-polymer into the reactor, a gas line to the feed, a discharging line to discharged polymerized produce, a circuit connected to the reactor to purify the gas and to recover pre-polymer particles which include separator means, and baffles or shelves disposed within the reactor to cause an increase of intrinsic viscosity of PET pre-polymers flow. Chen et al. teach that with multiple stage fluidized SSP reactor would tighten the distribution of residence time and reduce the residence time required to give a desired intrinsic viscosity. Chen et al. further teach that if each stage of the multiple fluidized reactor is not discrete separate so that the polymer flows from one stage continuously into the other, the reaction proceeds near plug flow conditions. Chen et al. teach that the beads have a maximum linear dimension of no more than 1 millimeter on average and between about 100 and about 250 microns which is within the range as claimed by applicant. The bead are fed to a hopper (12) and continuously feeds the beads through a line

(14) via a control valve (16) and dispenser (18) to a fluidized multistage SSP reactor (20) that can be operated at a temperature of 150°C to 240°C and preferably 210°C to 230°C for solid phase polymerization of PET. The SSP reactor includes at least one wall, a cylindrical wall (22) in include a plurality of baffles (24). The baffles (24) divide or partition the reactor into a plurality of reactor chambers of stages (26). Openings (28) in the baffles (24) allow fluidizing gas there through to fluidize the beds above the baffle. Free edges (32) of baffles have portions spaced apart from all portions of the wall 22. Chen et al. further teach that the baffles may also includes skirts (30) depending from the free edges (32) of baffles (24). Chen et al. teach that the SSP reactor can have between 2 and about 30 reactor stages (26). Chen et al. teach that the most benefit is received with intrinsic viscosity increases level out at about 20 stages and that 5 stages have been found to be the most beneficial. [Note Column 7, lines 6-35] Chen et al. teach hot, oxygen free inert gas, typically nitrogen is distributed to the SSP reactor (20) to heat the bead to the desired temperature. The inert gas is delivered through line (42) to the lower baffle (24) by a distributor (44). Gas line (46) removes inert gas with gaseous by products and entrained polymer bed from the reactor to a cyclone separator (50). [Note Column 7, lines 3-51 and Column 8, lines 5-60]. Chen fully anticipates applicant's claims as drafted.

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

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1. Determining the scope and contents of the prior art.
 2. Ascertaining the differences between the prior art and the claims at issue.
 3. Resolving the level of ordinary skill in the pertinent art.
 4. Considering objective evidence present in the application indicating obviousness or nonobviousness.
7. Claims 70,75,77,89-90,92,113,114 and 116-119 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chen et al., US Patent 7,098,300.

Chen et al. teach the invention for reasons delineated above, the reactor as described by Chen et al. is constructed to be a multistage fluidized bed reactor designed for performing solid phase continuous polymerization. Chen et al. specifically teach that the multistage fluidized SSP reactor tightens the distribution of residence time and resulting average intrinsic viscosity of the polymer product as the polymer bends continuously flow through the sequential stages under plug-flow conditions.[Note Column 6, lines 21-36 and 50-66; Column 7, lines 3 to Column 8, lines 5-60]

However, Chen et al. do not teach the specific construction of the baffles and that the device for regulating the flow rate of the feed pre-polymer is a rotating volumetric distribution apparatus and the dew point of the gases entering the reactor.

Chen et al. teaches the invention substantially as claimed, Chen et al. has described that the air flows through the baffles and include openings (28). Although the specific material of the baffles are not disclosed to use a perforated metal for the baffles would have been obvious to one familiar with reactor design specifically for solid phase polymerization or condensation reactions where it has been taught by the reference which specifically makes PET wherein the intrinsic viscosity is Increased using the multistage SSP reactor, to specifically choose a particular material would have been obvious to one having ordinary skill in the art at the time the invention was made absent criticality in showing. With respect to using a rotating volumetric distribution type of device for introducing the prepolymer, this again would have been obvious

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from reading the reference of Chen et al. wherein it has been taught to introduce the pre-polymer into a multistage fluidized SSP reactor, to select a specific type of introduction device for the pre-polymer where it has been generically taught to introduce the material into the reactor of Chen et al. which is operated under the same conditions for making PET renders applicant's invention as a whole obvious. Similarly, with respect to the dew point of the fluidizing gas, again to control the dew point it would have been obvious to control the gas introduction into the reactor from reading Chen et al. It is maintained that Chen et al. fairly teaches and suggests applicant's invention as claimed.

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Duh teaches a process for solid state polymerization of polyesters. Yang et al. teach a batch type polyester polymerization apparatus. Ember et al. teach a reaction process in a multi-stage fluidized bed reactor. Suzuoka et al. teach a machine for solid phase polymerization. Pikus teach a process and apparatus for solid phase polymerization of polymers. Jezl et al. teach a horizontal reactor for the vapor phase polymerization of monomers.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to N. Bhat whose telephone number is 571-272-1397. The examiner can normally be reached on Monday-Friday, 9:30AM-6:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Caldarola can be reached on 571-272-1444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/N. Bhat/
Primary Examiner, Art Unit 1797